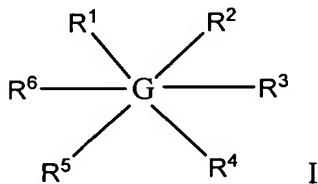


**AMENDMENTS TO THE CLAIMS:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

**LISTING OF CLAIMS:**

1. (Currently Amended) A heterodiamondoid compound of the following Formula I:



wherein:

G is comprising a diamondoid nucleus selected from a triamantane or higher diamondoid nucleus having at least one of its carbon atoms replaced by a heteroatom selected from the group consisting of nitrogen, phosphorus, selenium, aluminum, and arsenic; and

R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup>, R<sup>5</sup>, and R<sup>6</sup> are each independently hydrogen or a covalently bonded functional group, provided that the covalently bonded functional group does not comprise a heteroaryl or heterocycle moiety.

2. (Currently Amended) The heterodiamondoid compound of claim 1 wherein at least one secondary carbon in the diamondoid nucleus is replaced by a heteroatom.
3. (Currently Amended) The heterodiamondoid compound of claim 1 wherein at least one tertiary carbon in the diamondoid nucleus is replaced by a heteroatom.
4. (Currently Amended) The heterodiamondoid compound of claim 1 comprising one heteroatom.
5. (Currently Amended) The heterodiamondoid compound of claim 1 comprising more than one heteroatoms.

6. (Currently Amended) The heterodiamondoid compound of claim 1 comprising two or more different heteroatoms.

7. (Canceled)

8. (Canceled)

9. (Currently Amended) A The heterodiamondoid compound of claim 1 wherein the diamondoid nucleus is a triamantane nucleus.

10. (Currently Amended) A The heterodiamondoid compound of claim 1 wherein the diamondoid nucleus is a higher diamondoid nucleus.

11. (Currently Amended) A The heterodiamondoid compound of claim 1 wherein at least one of the heteroatoms replacing a carbon atom is an electron-donating heteroatom.

12. (Canceled)

13. (Currently Amended) The heterodiamondoid compound of claim 11, wherein the electron-donating heteroatom is selected from the group consisting of nitrogen, phosphorus, and arsenic.

14. (Currently Amended) The heterodiamondoid compound of claim 11, which is an aza-diamondoid.

15. (Currently Amended) The heterodiamondoid compound of claim 11, wherein the electron-donating heteroatom is sp<sup>3</sup>-hybridized in the diamond lattice.

16 - 25. (Canceled)

26. (Currently Amended) A The functionalized heterodiamondoid compound comprising a heterodiamondoid of claim 1 with one or more covalently bonded

functional groups pendant from its diamondoid nucleus wherein at least one of R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup>, R<sup>5</sup>, and R<sup>6</sup> is a covalently bonded functional group.

27. (Currently Amended) A The functionalized heterodiamondoid compound of claim 9 comprising a heterodiamondoid of claim 8 with one or more covalently bonded functional groups pendant from its diamondoid nucleus wherein at least one of R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup>, R<sup>5</sup>, and R<sup>6</sup> is a covalently bonded functional group.

28. (Currently Amended) A The functionalized heterodiamondoid compound comprising a heterodiamondoid of claim 10 with one or more covalently bonded functional groups pendant from its diamondoid nucleus wherein at least one of R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup>, R<sup>5</sup>, and R<sup>6</sup> is a covalently bonded functional group.

29. (Currently Amended) The functionalized heterodiamondoid compound of claim 26 wherein the one or more functional groups covalently bonded functional group comprise a group selected from the group consisting of halo, thio, oxide, hydroxyl, nitro, sulfonylhalide, sulfonate, phosphine, added alkyl, alkenyl, alkynyl and aryl, with or without substitution.

30. (Currently Amended) A The functionalized heterodiamondoid compound of claim 26 wherein the one or more functional groups comprise a halo.

31. (Currently Amended) The functionalized heterodiamondoid compound of claim 26 wherein the one or more functional groups comprise a hydroxide.

32. (Original) The functionalized heterodiamondoid compound of claim 26 wherein the one or more functional groups comprise an oxide.

33. (Currently Amended) The functionalized heterodiamondoid compound of claim 26 wherein the one or more functional groups comprise a nitrate.

34. (Currently Amended) The functionalized heterodiamondoid compound of claim 26 wherein the one or more functional groups comprise a group selected from

the group consisting of haloalkyl; haloalkenyl; haloalkynyl; hydroxyalkyl; heteroaryl; alkylthio; alkoxy; aminoalkyl; aminoalkoxy; heterocycloalkoxy; cycloalkyloxy; aryloxy; heteroaryloxy; -C(O)Z wherein Z is hydrogen, alkyl, halo, haloalkyl, halothio, amino, monosubstituted amino, disubstituted amino, cycloalkyl, aryl, heteroaryl; -CO2Z; -R7COZ wherein R7 is alkenyl, aminoalkenyl, or haloalkenyl; -R7COOZ; -OSO3H; NH2; NHR'; NR'R"; and N+R'R"R''' wherein R', R", and R''' are independently alkyl, thio, thioalkyl, heteroalkyl, aryl, or heteroaryl; R8NHCOR9 wherein R8 is selected from the group consisting of CH2, OCH2, NHCH2, CH2CH2, and OCH2CH2 and R9 is selected from the group consisting of alkyl, aryl, heteroaryl, aralkyl, and heteroaraylkly; and R10CONHR11 wherein R10 is selected from the group consisting of CH2, OCH2, NHCH2, CH2CH2, and OCH2CH2, and R11 is selected from the group consisting of alkyl, aryl, heteroaryl, aralkyl, and heteroaralkyl.

35. (Currently Amended) The functionalized heterodiamondoid compound of claim 26, wherein the one or more functional groups comprise a polymerizable functional group.

36. (Currently Amended) The heterodiamondoid compound of claim 1 as a discrete molecule.

37. (Currently Amended) The heterodiamondoid compound of claim 1 as a crystal.